

1 suggestions are incorporated in the claims as amended. These changes track the language in the
2 specification.

3 Claims 72, et seq have been altered to remove the objectionable language as suggested by
4 the examiner.

5 In order to maintain continuity in the examination and for the benefit of examination,
6 applicant confirms a willingness, if required, to apply these limited claims to tetravalent atoms
7 with alkoxy functional groups and wherein the non-acid producing solute is defined by the
8 formula $R_3X_aX_b$ groups and a catalyst added to solution prior to application to wood and wherein
9 the catalyst produces an acid. For purposes of examination, $R_3X_aX_{b3}$ should be examined with
10 RX_aX_b as well as $R_2X_aX_b$.

11 IN THE CLAIMS:

12 1. Please cancel claims 79, 99, 102-103, 113-118.

13 The claims remaining are: 72-78, 80-96, 98-101, 104-108, 111-112. Claims 97 and 113-118 are
14 rewritten as new claims 119-125 to remove the objections in 16(i) and (k) with a minimum of
15 confusion.

16 CLAIMS:

17 (AMENDED) 72. A process for treating wood having wood cellulose having a
18 plurality of hydroxyl groups comprising the steps of:

19 providing a solution consisting essentially of a water compatible organic solvent and a
20 dissolved solute having a functional group comprising an atom selected from the group
21 consisting of trivalent, tetravalent and pentavalent atoms, wherein said atom is bonded to a
22 halogen atom or a functional group selected from the group consisting of a hydroxyl group,
23 alkoxy group, phenoxy group, benzyloxy group and an aryloxy group having a polycyclic

1 aromatic ring, and wherein the organic solvent is further defined as capable of allowing the
2 dissolved solutes to be drawn from the solute into the wood;
3 adding a catalyst reacting with water in the wood to produce an acid;
4 applying said solution to the wood;
5 drawing the catalyst and solute into the wood;
6 hydrolyzing the catalyst with the water within the wood to produce an acid;
7 covalently reacting said functional groups with the hydrolyzed acid and cellulose forming
8 covalent bonds with the cellulose.

9 (AMENDED) 73. The process according to claim 76 wherein the solutes are not
10 polymerized prior to drawing the catalyst into the wood.

11 (AMENDED) 74. The invention of claim 72 wherein heat is generated by the acid
12 hydrolyzing in the water in the wood and the solutes reacting with the cellulose.

13 (AMENDED) 75. The process according to claim 72 wherein the process of drawing
14 further comprises water in the wood pulling the solutes from the solvent into the wood and
15 reacting the cellulose with the hydrolyzed acid and solute.

16 (AMENDED) 76. The process of claim 75 wherein the solutes are not polymerized
17 prior to drawing the catalyst into the wood.

18 (AMENDED) 77. The process of claim 72 wherein the catalyst is less than 10% by
19 mass of the entire solution.

20 (AMENDED) 78. The process of claim 72 wherein the step of covalently reacting
21 further comprises the step of catalytically bonding the functional group across an oxygen of the
22 cellulose base catalyst.

23 79. CANCELLED.

1 (AMENDED) 80. A process for treating wood having wood cellulose having a
2 plurality of hydroxyl groups comprising the steps of:

3 providing a solution consisting essentially of a water compatible organic solvent and a
4 solute having a functional group comprising an atom selected from the group consisting of
5 trivalent, tetravalent and pentavalent atoms, wherein said atom is bonded to a halogen atom or a
6 functional group selected from the group consisting of a hydroxyl group, alkoxy group, phenoxy
7 group, benzyloxy group and an aryloxy group having a polycyclic aromatic ring, and wherein the
8 solvent is further defined as allowing the solutes to be drawn from the solute into the wood;

9 adding a catalyst reacting with water in the wood to produce a base;

10 applying said solution to the wood;

11 drawing the catalyst and solute into the wood;

12 reacting the catalyst with the water in the wood to produce a hydrolyzed base;

13 covalently reacting said functional groups with the hydrolyzed base and the cellulose.

14 (AMENDED) 81. The process of claim 72 wherein the acid is a strong acid.

15 (AMENDED) 82. The process according to claim 72 wherein the step of reacting
16 further comprises reacting without adding heat or pressure to initiate the reaction prior to
17 drawing the catalyst into the wood.

18 (AMENDED) 83. The process of claim 77 wherein the catalyst is in the range of 0.1-
19 10% of the solution.

20 (AMENDED) 84. The process of claim 83 wherein the catalyst is in the range from
21 0.1 to 4.9% of the solution.

22 85. The process of claim 81 wherein the acid is selected from the group consisting of
23 acids from alkyl-halide monomers with trivalent, tetravalent and pentavalent atoms.

1 (AMENDED) 86. The process of claim 85 wherein the acid is comprised of silicon
2 and a halogen.

3 (AMENDED) 87. The process of claim 72 wherein the solute further comprises a first
4 molecule producing acid in the presence of water and a second molecule not producing acid in
5 the presence of water and wherein the second molecule reacts to covalently bond with wood
6 cellulose in the presences of acid from the first molecule.

7 (AMENDED) 88. The process of claim 87 wherein a molecule which does not
8 produce an acid in the presence of water in wood cellulose reacts to produce heat with wood
9 cellulose in the presence of the molecule producing an acid in the presence of water in wood
10 cellulose.

11 (AMENDED) 89. The process of claim 88 wherein the non-acid producing molecule
12 is from the group consisting of alkyl and hydroxyl or alkoxy bonded trivalent, pentavalent and
13 tetravalent atoms and combines thereof.

14 (AMENDED) 90. The process of claim 85 wherein the catalyst is from the group
15 consisting of hydrochloric, meta-phosphoric acid, poly-phosphoric acid, Phosphoric acid, and
16 combinations thereof.

17 91. The process of claim 85 wherein the acid is in the range of 0.01-10% *in situ*.

18 (AMENDED) 92. The process of claim 72 wherein the process further comprises
19 minimizing water in the solvent to prevent reaction of the solutes and hydrolyzing the acid prior
20 to applying said solution to said wood.

21 93. The process of claim 72 further comprising the step of:
22 adding at least one non-reactive additive to the wood cellulose that enhances a desired
23 property selected from the group consisting of:

1 fire resistance,
2 insect resistance,
3 moisture resistance
4 color,
5 adhesion, and
6 insulation, and
7 combinations thereof.

8 (AMENDED) 94. The process of claim 93 wherein the step of adding at least one
9 non reactive additive further comprises adding the additive to the solution.

10 (AMENDED) 95. The process of claim 93 wherein the step of adding the at least one
11 non-reactive additive occurs before reacting the functional groups to bond with the wood
12 cellulose.

13 96. The process of claim 93 wherein the additive is selected from the group consisting
14 of:

15 diatomaceous earth,
16 sodium silicates,
17 boron or silicon salts,
18 boric acid,
19 trimethyl (trialkyl) borate,
20 Boron Halides (BF₃, BCl₃, etc.),
21 Boric Anhydride (boron oxide),
22 phosphorous compounds,
23 copper compounds,

metal alkoxide,
meta-phosphoric acid;
a hydrophobic reagents,
phosphoric acid, and
metaphosphoric acid,
and combinations thereof.

97. (CANCELLED)

(AMENDED) 98. The process according to claim 72, wherein the wood cellulose has an original weight and wherein the step of reacting further comprises reaction for a duration of time to attain a weight gain by covalent bond formation in a range of 0.1 to 10 weight percent of the original weight of the wood cellulose.

(AMENDED) 99. The process according to claim 72, further comprising forming cyclic interlocking molecules having as a part of the cyclic structure containing at least two carbons of the cellulose and at least two of the atoms from the functional groups consisting of trivalent, tetravalent and pentavalent atoms.

100. The process of claim 81 further comprising the step of exposing the acids introduced into the wood to an acid neutralizing agent.

101. The process of claim 81 further comprising the step of introducing an acid neutralizing agent into the wood prior to the exposure of the wood cellulose to the acid.

102. (CANCELLED)

103. (CANCELLED)

(AMENDED) 104. A process according to claim 72 wherein the wood cellulose is not dry and wherein the step of drawing further comprises solvating the functional groups by the

1 water in the wood prior to being covalently bonded to the hydroxyl groups of said wood
2 cellulose.

3 (AMENDED) 105. The process according to claim 72 further comprising the step of
4 adding water to the wood cellulose prior to applying the solution to the wood cellulose.

5 (AMENDED) 106. A process for treating wood cellulose containing water, said
6 cellulose having a plurality of hydroxyl groups comprising the steps of:

7 providing a solution comprised of a water compatible organic solvent and a solute having
8 a plurality of unreacted solutes comprising an atom selected from the group consisting of
9 trivalent, tetravalent and pentavalent atoms, wherein said atom is bonded to a halogen atom or a
10 functional group selected from the group consisting of a hydroxyl group, alkoxy group, phenoxy
11 group, benzyloxy group and an aryloxy group having a polycyclic aromatic ring, applying said
12 solution to the wood cellulose; and simultaneously pulling said solution into the wood using the
13 water within the wood and reacting said solute to form covalent bonds, and forming a matrix
14 structure comprising reacted monomers and wood cellulose.

15 107. The process of claim 106 further comprising the step of:

16 adding at least one non-reactive additive that enhances a desired property selected from
17 the group consisting of:

18 fire resistance,

19 insect resistance,

20 moisture resistance

21 color,

22 adhesion, and

23 insulation, and

1 combinations thereof.

2 108. The process of claim 107 wherein the step of adding the at least one non-reactive
3 additive occurs before covalently bonding the compound to the wood cellulose.

4 109. Cancelled.

5 110. The process according to claim 106, further comprising a step of exposing
6 the wood to ultra-sound sonification while applying said solution.

7 (AMENDED) 111. A process for treating wood cellulose, in wood having water in the
8 wood having a plurality of hydroxyl groups comprising the steps of:

9 providing a solution comprised of a water compatible organic solvent; an acid; an atom
10 selected from the group consisting of trivalent, tetravalent and pentavalent atoms, wherein said
11 atom is bonded to a halogen atom or a functional group selected from the group consisting of a
12 hydroxyl group, alkoxy group, phenoxy group, benzyloxy group and an aryloxy group having a
13 polycyclic aromatic ring, applying said solution to the wood cellulose; solvating the acid with
14 the water in the wood to produce a hydrolyzed acid and reacting the atom with the hydrolyzed
15 acid and the wood cellulose to produce heat and a silicone cellulose bond.

16 (AMENDED) 112. The process of claim 111 wherein the step of reacting further
17 comprises the step of pulling the atoms from the solvent into the wood.

18 113. (CANCELLED)

19 114. (CANCELLED)

20 115. (CANCELLED)

21 116. (CANCELLED)

22 117. (CANCELLED)

23 118. (CANCELLED)

1 (NEW CLAIM) 119. The process of claim 72 wherein the solute compound is comprised
2 of a tetravalent atom and comprises functional groups selected from the group consisting of R-
3 X_a-Xb_3 , R_3-X_a-Xb , $R_2-X_a-Xb_2$, R_4-X_a , and X_aR_3 wherein R is an alkyl or a combination thereof, X_a
4 is a trivalent, tetravalent or pentavalent atom or a combination thereof and X_b is a halogen or
5 alkoxy or hydroxyl group or combination thereof.

6 (NEW CLAIM) 120. The process of claim 111 wherein the acid is in the range of 0.1-
7 10% of the solution.

8 (NEW CLAIM) 121. The process of claim 120 wherein the molecule which produces
9 an acid in the presence of wood cellulose is in the range from 0.1 to 4.9% of the solution.

10 (NEW CLAIM) 122. The process of claim 121 wherein the acid is selected from the
11 group consisting of acids from alkyl-silicon halides, acids from alkyl-halide monomers
12 with trivalent, tetravalent and pentavalent atoms, hydrochloric acid, meta-phosphoric acid, poly-
13 phosphoric acid, [bases from metal alkoxides] and Phosphoric acid and combinations thereof,
14 and wherein the acid is in the range of 0.01-10% *in situ*.

15 (NEW CLAIM) 123. The process of claim 121 wherein the first molecule which
16 produces an acid in the presence of water in wood cellulose is a molecule comprised of silicone
17 and a halogen.

18 (NEW CLAIM) 124. The process of claim 121 wherein the step of reacting further comprises
19 reacting without adding heat or pressure to initiate the reaction prior to drawing the catalyst into
20 the wood.

21 (NEW CLAIM) 125. The process of claim 121 wherein the second molecule which does not
22 produce an acid in the presence of water in the wood cellulose would include hydroxyl and
23 alkoxy bonded tetravalent atoms.